

Application No. 09/121,528

Docket No.: M4065.0069/P069
(PATENT)

EXHIBIT A



Docket No.: M4065.0069
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:
Derderian, Garo J.

Application No.: 09/121,528

Group Art Unit: 1762

Filed: July 23, 1998

Examiner: T. Meeks

For: CONTINUOUS GOOD STEP COVERAGE
CVD PLATINUM METAL DEPOSITION

DECLARATION OF CEM BASCERI, Ph.D.

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

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TC 1700

I, Dr. Cem Basceri, do hereby declare that:

1. I currently reside at 314 East Iowa Drive, Boise, Idaho 83706.
2. I am of legal age and under no disability that prevents me from attesting to the following statements and information which are based on my personal knowledge and observations.
3. I am currently employed by Micron Technology, Inc. as a Senior Project-Lead Engineer. I have been employed by Micron Technology, Inc. as a Process Development Engineer since January 1998. Previously, I was employed by North Carolina State University for three years (1994-1997) as a Research Assistant in the Materials Science Department.

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4. I have a Master of Science degree in Materials Science and Engineering from Middle East Technical University of Ankara, Turkey (received 1994), and a Doctoral degree in Materials Science and Engineering from North Carolina State University (received 1997).

5. From January 1998 to the present, I have been engaged in the research and development of film deposition and film treatment processes used in semiconductor manufacturing. In particular, I have been the Lead Project Engineer on various developmental projects regarding the chemical vapor deposition (CVD) of metals, including titanium, titanium nitride, and tungsten, among others, in CVD metallization for DRAM manufacturing. As a result, I have knowledge of the chemical vapor deposition of thin films, of the development of these thin films, and of the optimization of the CVD deposition conditions of these thin films.

6. My experience includes the research and development of processes for the deposition of platinum and ruthenium by CVD associated with DRAM manufacturing, including improved step coverage and uniformity of deposition.

7. I am informed that claims 1-4, 6-10, 12-36, and 46-68 of the above-captioned Application No. 09/121,528 of Garo J. Derderian (hereinafter "the '528 application"), the title of which is "Continuous Good Step Coverage CVD Platinum Metal Deposition," are under final rejection by the U.S. Patent and Trademark Office, and that there is a current appeal of the rejections to the Board of Patent Appeals and Interferences.

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8. As of the filing date of the '528 application, and indeed as of the present, a person having ordinary skill in the art of deposition of metals by CVD would be a person with at least a Masters degree in Materials Science and Engineering and with three (3) years processing experience in the deposition processes of the semiconductor industry. I am knowledgeable as to what such a person of ordinary skill in the art would have known and understood relating to the deposition of CVD metals in semiconductor processing as of January 1998.

9. I have received and reviewed the '528 application filed in the U.S. Patent and Trademark Office on July 23, 1998. I have also received and reviewed a copy of each of the following references applied by the U.S. Patent and Trademark Office in the rejections of various groupings of the aforementioned claims: U.S. Patent No. 5,783,716 to Baum et al. ("Baum"); "Low-Temperature Organometallic Chemical Vapor Deposition Of Platinum," Yea-jen Chen, Herbert D. Kaesz, Hareesh Thridandam and Robert F. Hicks, *Appl. Phys. Lett.* 53(17), 24 October 1988, pages 1591-1592; and "Characterization of Pt. Thin Films Deposited by Metallorganic Chemical Vapor Deposition for Ferroelectric Bottom Electrodes," Ju-Hong Dwon and Soon-Gil Yoon, *Electrochem. Soc.*, Volume 144, No. 8, August 1997, pages 2848-2854.

10. I have received and reviewed the Appellant's Amended Brief on Appeal filed on May 29, 2001. I have also received and reviewed the Examiner's Answer mailed by the U.S. Patent and Trademark Office on July 13, 2001.

11. The Examiner's Answer includes the following assertion:

[B]ecause this flow rate [i.e., the flow rate at which the oxygen/nitrous oxide is delivered to the chamber in Baum] affects the amount of oxidizing gas mixture provided to the chamber for removal of carbon impurities and would also depend on the amount and type of platinum

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precursor delivered, deposition rate, etc. which factors determine how much carbon is present, the total flow rate of oxidizing gases to the chamber is a result effective parameter and it would have been a matter of routine experimentation to determine appropriate amounts (flow rates) of the oxidizing gases to provide to optimize removal of carbon from the film.

Examiner's Answer at pages 4, 6, and 8.

12. I disagree with the assertion quoted in paragraph 11 for the following reason.

Excessive dilution of a precursor gas or of a metal-containing gas can in fact ultimately have a detrimental effect, leading to poor step coverage. Such dilution of a metal containing gas can occur if the flow rates of the oxidizer and/or the inert gases are increased beyond a certain limit during a deposition process. For example, during the deposition of titanium nitride (TiN), as the flow rate of the carrier gas increases at the beginning of the deposition process, the deposition rate of TiN and the step coverage also increase accordingly. Further increases in the amount of the carrier gas will negatively affect the deposition rate of TiN and its step coverage, however, because the precursor gas ultimately becomes too diluted.

13. Thus, in deposition processes employed in the semiconductor industry, increasing the flow rate of even one oxidizing gas can at some point decrease the step coverage because the precursor gas becomes overly diluted.

14. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the

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United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,



Dr. Cem Basceri

Date: 9, 12, 2001